WHAT IS CLAIMED IS:

1. A method for detecting the presence or amount of one or more analytes, comprising:

associating a first electrolyte solution containing at least one analyte with a first compartment comprising a first electrode and a second electrode;

associating a light emitting source with a second compartment comprising a third electrode and a fourth electrode;

electronically coupling the first and third electrodes;

causing a potential difference between the second and fourth electrodes; and

detecting light emitted from the light emitting source in the second compartment, thereby indicating the presence or amount of the at least one analyte in the first compartment.

2. The method of Claim 1, wherein the light emitting source comprises an electrochemiluminescent (ECL) system.

3. The method of Claim 1, wherein the light emitting source is a light-emitting diode.

4. The method of Claim 3, wherein the light-emitting diode is a semiconductor light-emitting diode.

5. The method of Claim 3, wherein the light-emitting diode emits visible light.

6. The method of Claim 1, wherein the first electrode and third electrode comprise one monolithic bipolar electrode.

7. The method of Claim 1, further comprising:

associating a plurality of first electrodes with the first compartment;

associating a plurality of third electrodes with the second compartment;

associating a plurality of light emitting sources with the second compartment;

electronically coupling respective first and third electrodes; and

detecting light emitted from each light emitting source in the second compartment.

8. The method of Claim 7, wherein the plurality of light emitting sources are light-emitting diodes.

9. The method of Claim 7, wherein the second electrode is a cathode and the fourth electrode is an anode.

10. The method of Claim 7, wherein the second electrode is an anode and the fourth electrode is a cathode.

11. A method for detecting the presence or amount of an analyte, comprising:

associating a first electrolyte solution containing the analyte with a first region of a bipolar electrode;

associating a second electrolyte solution containing an electrochemiluminescent system with a second region of the bipolar electrode;

ionically isolating the first electrolyte solution from the second electrolyte solution;

causing a potential difference between the first and second electrolyte solutions; and

detecting light emitted from the electrochemiluminescent system, thereby indicating the presence or amount of the analyte at the first region of the bipolar electrode.

12. The method of Claim 11, further comprising causing the first and second electrolyte solutions to have the same composition.

13. The method of Claim 11, wherein associating a first electrolyte solution containing the analyte with a first region of a bipolar electrode comprises associating the first electrolyte solution containing the analyte with respective first regions of a plurality of bipolar electrodes; and

wherein associating a second electrolyte solution containing an electrochemiluminescent system with a second region of the bipolar electrode comprises associating the second electrolyte solution containing the electrochemiluminescent system with respective second regions of the plurality of bipolar electrodes.

14. The method of Claim 13, further comprising causing the potential difference between the first and second electrolyte solutions to be the same for each of the plurality of bipolar electrodes.

15. The method of Claim 11, wherein causing a potential difference between the first and second electrolyte solutions comprises imparting a potential difference between a first electrode associated with the first electrolyte solution and a second electrode associated with the second electrolyte solution.

16. The method of Claim 15, wherein the first electrode is a cathode and the second electrode is an anode.

17. The method of Claim 15, wherein the first electrode is an anode and the second electrode is a cathode.

18. The method of Claim 11, wherein the first region of the bipolar electrode has a larger surface area than the second region.

19. The method of Claim 13, wherein the respective first regions of the plurality of bipolar electrodes have a larger surface area than the respective second regions.

20. A system for detecting the presence or amount of one or more analytes, comprising:

a first compartment comprising a first electrode and a second electrode;

a first electrolyte solution containing at least one analyte associated with the first compartment;

a second compartment comprising a third electrode and a fourth electrode;

a light emitting source associated with the second compartment;

a conductor electronically coupling the first and third electrodes;

a voltage source operable to generate a potential difference between the second and fourth electrodes; and

a detector operable to detect light emitted from the light emitting source in the second compartment, thereby indicating the presence or amount of the at least one analyte in the first compartment.

21. The system of Claim 20, wherein the light emitting source comprises an electrochemiluminescent (ECL) system.

22. The system of Claim 20, wherein the light emitting source is a light-emitting diode.

23. The system of Claim 22, wherein the light-emitting diode is a semiconductor light-emitting diode.

24. The system of Claim 22, wherein the light-emitting diode emits visible light.

25. The system of Claim 20, wherein the first electrode and third electrode comprise one monolithic bipolar electrode.

26. The system of Claim 20, wherein:

the first compartment comprises a plurality of first electrodes;

the second compartment comprises a plurality of third electrodes;

the light emitting sources comprises a plurality of light emitting sources associated with the second compartment;

the conductor comprises a plurality of conductors electronically coupling respective first and third electrodes; and

the detector is operable to detect light emitted from each light emitting source in the second compartment.

27. The system of Claim 26, wherein the plurality of light emitting sources are light-emitting diodes.

28. The system of Claim 26, wherein the second electrode is a cathode and the fourth electrode is an anode.

29. The system of Claim 26, wherein the second electrode is an anode and the fourth electrode is a cathode.

30. A system for detecting the presence or amount of an analyte, comprising:

a first compartment;

a first electrode and a first end of a bipolar electrode associated with the first compartment;

a second compartment;

a second electrode and a second end of the bipolar electrode associated with the second compartment;

a first electrolyte solution containing the analyte disposed within the first compartment;

a second electrolyte solution containing an electrochemiluminescent system disposed within the second compartment;

a conductor electronically coupling the first end of the bipolar electrode and the second end of the bipolar electrode;

a voltage source operable to generate a potential difference between the first and second electrodes; and

a detector operable to detect an optical signal generated by the electrochemiluminescent system in the second compartment, thereby detecting the presence or amount of the analyte in the first compartment.

31. The system of Claim 30, wherein the first and second compartments share a common barrier, the common barrier comprising an ionically impermeable barrier.

32. The system of Claim 31, wherein the first and second ends of the bipolar electrode and the conductor coupling the first and second ends comprise a monolithic bipolar electrode that spans the common barrier.

33. The system of Claim 32, further comprising at least two bipolar electrodes spanning the common barrier between said first and second compartments.

34. The system of Claim 32, wherein the first region of the bipolar electrode has a larger surface area than the second region.

35. The system of Claim 32, further comprising:

a plurality of first compartments having respective first electrodes associated therewith;

the voltage source operable to generate a potential difference between the respective first electrodes and the second electrode; and

the detector operable to detect the optical signal generated by the electrochemiluminescent system in the second compartment, thereby detecting the presence of the analyte in at least one of the first compartments.

36. The system of Claim 35, wherein the voltage source is operable to generate the potential difference in a sequential series of the first compartments.

37. The system of Claim 35, wherein the voltage source is operable to generate the potential differences simultaneously.

38. The system of Claim 30, comprising:

a plurality of first compartments;

respective first electrodes and respective first ends of the bipolar electrode associated with the first compartments;

a switch operable to electronically couple the conductor between one of the respective first ends of the bipolar electrode and the second end of the bipolar electrode;

the voltage source operable to generate a potential difference between the respective first electrodes and the second electrode; and

the detector operable to detect the optical signal generated by the electrochemiluminescent system in the second compartment, thereby detecting the presence of the analyte in one of the first compartments.

39. The system of Claim 30, wherein the first electrode and first end of the bipolar electrode are plane parallel and have a separation gap of less than 15 um.

40. A system for detecting the presence or amount of an analyte, comprising:

means for coupling a first electrolyte solution containing the analyte with a first electrode region;

means for coupling a light emitting source with a second electrode region;

means for electronically coupling the first and second electrode regions;

means for generating a potential difference between the first and second electrode regions; and

means for detecting light emitted from the light emitting composition at the second electrode region, thereby indicating the presence or amount of the analyte at the first electrode region.

41. The system of Claim 40, further comprising means for ionically coupling the first and second electrolyte solutions.

42. The system of Claim 40, further comprising means for ionically isolating the first and second electrolyte solutions.

43. The system of Claim 40, wherein the light emitting source is an electrochemiluminescent system.

44. The system of Claim 40, wherein the light emitting source is a light-emitting diode.